

Amendments to the Claims:

1. (Cancelled)

2. (Currently Amended) ~~Drive The drive~~ mechanism according to claim [[1]] 3, wherein:

5 the piston [[(4)]] is equipped on each of its face sides with ~~the piston one each~~ permanent magnet (18, 19 respectively); and

~~where in each instance a the stator~~ permanent magnets (15, 16 respectively) ~~be are~~ located in the area of ~~the~~ face sides of the cylinder [[(3)]].

3. (Currently Amended) ~~Drive A reciprocating piston drive~~ mechanism, according to one of the claims 1 or 2, wherein: comprising:

a housing,

5 a cylinder defined in said housing,

~~the stator~~ permanent magnets (15, 16) ~~on the stator side are located disposed in the cylinder[[13]]~~, and ~~where a piston mounted for back and forth movement in the cylinder, the face sides of the piston (4) are in each instance~~

10 ~~being~~ equipped with recesses, which correspond to the dimensions of the ~~stator~~ permanent magnets (15, 16),

an electromagnetic drive for the piston including an electromagnet on a stator side and at least one permanent magnet on the piston,

15 the stator permanent magnets being disposed relative to the permanent magnet of the piston in such a way that the piston adopts a substantially centered axial position in an idle state on the stator side.

4. (Currently Amended) ~~Drive A reciprocating piston drive~~ mechanism according to claims 1 to 3, wherein on the stator side comprising:

a housing,

5 a cylinder defined in said housing,

a piston mounted for back and forth movement in the cylinder,

10 an electromagnetic drive for the piston including an electromagnet on a stator side and at least one permanent magnet on the piston,

stator permanent magnets disposed on the stator side and disposed relative to the permanent magnet of the piston in such a way that the piston adopts a substantially centered axial position in an idle state,

15 a pole component (yoke) (11) be provided with a cross section having a U-shape and the U-limbs of which end at the a level of the permanent magnets (15, 16) on the stator side.

5. (Currently Amended) ~~Drive~~ The drive mechanism according to claim 4, wherein the U-shaped pole component [(11)] encompasses at least one or several coils (8, 8', 8'') coil from three sides.

6. (Currently Amended) ~~Drive~~ The drive mechanism according to claim 5, wherein ~~there is located between the coil(s) and the cylinder (3) a further cylindrical pole component (12) shaped approximately like a pipe section is located between the coil and the cylinder.~~

7. (Currently Amended) ~~Drive~~ The drive mechanism according to one of the above claims claim 4, wherein axially arranged pole components (21 to 24) ~~be are~~ assigned to the permanent magnets (18, 19) at the piston [(4)].

8. (Currently Amended) Drive A reciprocating piston drive mechanism according to claim 1 or 2, wherein comprising:

a housing,

5 a piston mounted for back and forth movement in a cylinder, the piston ~~is being~~ equipped only with a single permanent magnet [(20)] situated approximately centrally in ~~the~~ an axial direction,

10 an electromagnet on a stator which interacts with the permanent magnet on the piston to drive the piston,  
stator permanent magnets disposed on the stator and disposed relative to the permanent magnet of the piston in such a way that the piston is biased toward a substantially centered axial position in an idle state.

9. (Currently Amended) Drive The drive mechanism according to claim 8, wherein ~~there is located one each permanent magnets (15, 16) on the stator side at the are located on opposite sides of the permanent magnet (20) on the side of the piston, and where the a distance [[of]] between the permanent magnets (15, 16) on the stator side corresponds to the an amplitude of the piston's motion.~~

10. (Currently Amended) Drive The drive mechanism according to claim 8 [[or 9]], wherein:  
~~two coils (8', 8'') are provided the axial direction next to each other along the axial direction,~~  
5 ~~where a yoke [(11)] encompasses the coils, where the a face side of a central yoke component [(11')] encompasses the permanent magnet (20) on the side of the piston, and where the face sides of the inner axially extending yoke components rest from the outside against the permanent magnets (15, 16) on the stator side.~~

11. (Currently Amended) Drive A reciprocating piston drive mechanism according to one of the claims 1 to 10, wherein it is of a comprising:  
5 a housing,  
a cylinder defined in said housing,  
a piston mounted for back and forth movement in the cylinder,  
10 a rotationally symmetrical design and where the permanent magnets (15, 16, 18, 19, 20) are each of electromagnetic drive for the piston including an electromagnet

on a stator and at least one ring-shaped design permanent magnet  
on the piston,

15 stator permanent magnets disposed on the stator and  
disposed relative to the ring-shaped permanent magnet of the  
piston in such a way that the piston is biased to a preselected  
axial position in an idle state.

12. (Currently Amended) Drive The drive mechanism according to one of the claims claim [[1 to]] 11, wherein the pole components and/or the magnetic forces are arranged, resp.  
selected to be stator includes axially symmetrical pole  
5 components.

13. (Currently Amended) Drive A reciprocating  
piston drive mechanism according to one of the claims 1 to 11,  
wherein comprising:

5 a housing in which a cylinder is defined,  
a stator surrounding the cylinder,  
a piston mounted for back and forth movement in the  
cylinder,

10 an electromagnetic drive for the piston including an  
electromagnet, permanent magnets, and pole components in the  
stator and at least one permanent magnet on the piston, at least  
one of the pole components and/or the interacting with the  
stator magnets such that resultant magnetic forces are arranged,  
resp. selected to be axially asymmetrical,

15 the stator permanent magnets being disposed relative  
to the piston permanent magnet to bias the piston toward a  
substantially centered axial position in an idle state.

14. (Currently Amended) Drive A reciprocating  
piston drive mechanism according to one of the above claims,  
wherein it is equipped with comprising:

5 a housing,  
a cylinder defined in said housing,  
a piston mounted for back and forth movement in the  
cylinder,

10        an electromagnetic drive for the piston including an electromagnet on a stator and at least one permanent magnet on the piston,

sensors {31, 32} for detecting the piston's position,  
      stator permanent magnets disposed on the stator  
      relative to the piston permanent magnet to urge the piston to  
      adopt a substantially centered axial position in an idle state.

15. (Currently Amended) Reciprocating A reciprocating piston vacuum pump with a drive mechanism according to one of the claims 1 to 14, wherein comprising:  
      a housing,

5        a cylinder defined in said housing,  
      a piston mounted in the cylinder for back and forth movement, the piston and the cylinder defining two chambers, at least one of the two chambers {34, 35} created by the piston [(14)] and the cylinder (3) be being equipped with an inlet 10 valve and a discharge valve,

an electromagnetic drive for the piston including a stator electromagnet and at least one piston permanent magnet,  
      stator permanent magnets disposed relative to the piston permanent magnet for biasing the piston to a substantially center axial position.

15. (Currently Amended) Pump A reciprocating piston vacuum pump according to claim 15, wherein comprising:

5        a housing;  
      a cylinder defined in the housing;  
      a piston mounted in the cylinder, the piston and cylinder defining a pair of chambers on opposite sides of the piston, the piston mounted for reciprocating movement in the cylinder, which reciprocating movement expands one of the chambers as it contracts the other;

10        an inlet line [(36)] opening at the outlet side into at least one of the chambers, the opening of said inlet line forming together with the piston [(4)] an inlet valve,  
      at least one permanent magnet mounted on the piston;

15        permanent magnets mounted on a stator such that  
      magnetic forces between the stator permanent magnets and the  
      piston permanent magnet urge the piston toward a substantially  
      central axial position; and,  
      an electromagnet on the stator for selectively urging  
      the permanent magnet on the piston to move the piston along the  
20        cylinder.

17. (Currently Amended) ~~Pump~~ A reciprocating piston  
pump according to claim 15 or 16, wherein pressure or piston  
controlled comprising:  
5        a housing;  
      a cylinder defined in the housing;  
      a piston mounted in the cylinder, the piston and  
      cylinder defining a pair of chambers on opposite sides of the  
      piston, the piston mounted for reciprocating movement in the  
      cylinder, which reciprocating movement expands one of the  
10        chambers as it contracts the other;  
      discharge valves (41, 42) are provided which are  
      controlled by one of pressure and the piston,  
      at least one permanent magnet mounted to a piston;  
      permanent magnets mounted on a stator such that  
15        magnetic forces between the stator permanent magnets and the  
      piston permanent magnet bias the piston toward a substantially  
      centered position axially; and,  
      an electromagnet on the stator for selectively urging  
      the permanent magnet on the piston to reciprocate the piston in  
20        the cylinder.

18. (Currently Amended) ~~Pump~~ The pump according to  
claim 17 wherein the discharge valves include closure pieces  
~~(43, 44)~~ of the discharge valves (41, 42) are designed as discs  
and which extend substantially over the entire cross section of  
5        the cylinder [[[3]]].

19. (Currently Amended) ~~Pump~~ The pump according to claim 18, wherein ~~the~~ closing motion of the closure pieces discs ~~(43, 44)~~ is effected assisted by the resilient forces of springs.

20. (Currently Amended) ~~Pump~~ The pump according to claim 18, wherein ~~the~~ closing motion of the closure pieces discs ~~(43, 44)~~ is effected assisted by the magnetic forces.

21. (Currently Amended) ~~Pump~~ The pump according to claim 20, wherein:

the ~~discs~~ (43, 44) are closure pieces include discs made at least partly of a ferromagnetic material; and  
5 where the ~~an~~ outer face side of one of the permanent magnets ~~(15, 16, 15', 16')~~ on the stator ~~side~~ forms the a discharge valve seat.

22. (Currently Amended) ~~Pump~~ A reciprocating piston drive mechanism according to one of the claims 15 to 21, wherein one or comprising:

5 a housing;  
several ~~cylinders/piston pairs~~ (3, 4, 3', 4') are accommodated in the housing [(2)],  
10 a piston mounted in each of the cylinders, the pistons and cylinders defining pairs of chambers on opposite sides of each piston, each piston being mounted for reciprocating movement in a corresponding one of the cylinders, which reciprocating movement expands one of the chambers as it contracts the other;

15 at least one permanent magnet mounted on each piston; permanent magnets mounted on a stator such that magnetic forces between the stator permanent magnets and the piston permanent magnets urge the pistons toward selected axial positions; and,

an electromagnet on the stator for selectively reciprocating each piston along the corresponding cylinder.

23. (Currently Amended) ~~Drive A drive mechanism or pump according to one of the above claims wherein one or comprising:~~

5                   a housing;  
5                   a cylinder defined in the housing;  
10                  a piston mounted in the cylinder, the piston and cylinder defining a pair of chambers on opposite sides of the piston, the piston mounted for reciprocating movement in the cylinder, which reciprocating movement expands one of the chambers as it contracts the other;  
15                  at least one permanent magnet mounted on the piston; permanent magnets mounted on a stator such that magnetic forces between the stator permanent magnets and the piston permanent magnet bias the piston;  
20                  an electromagnet on the stator for selectively urging the permanent magnet on the piston to move the piston along the cylinder; and,  
                      a switching means (63, 66, 67) for driving the electromagnet coil (2, 8, 8', 8'') are provided, said switching means being driven by sensors (31, 32) or other signals dependent on the piston's position.

24. (Currently Amended) ~~Method A method for operating a pump or a drive mechanism according to claim 13, wherein at least one of a the frequency of the piston's motion and/or the a maximum current flow in the coil(s) electromagnet is pre-set.~~

5                  Method The method according to claim 24 wherein the piston motion is reversed already before reaching the an end position of travel.

26. (Currently Amended) ~~Method according to claim 24 or 25 A method for operating a pump drive mechanism according to claim 22, wherein the related drive mechanisms are so controlled, that the pairs of the pistons (4, 4') will are controlled to reciprocate in opposite directions.~~

27. (Currently Amended) Piston A piston for a reciprocating piston pump drive mechanism according to one of the claims claim 15 to 22, wherein it is composed of, the piston including: two pot components (70, 71) which in the an area of 5 their open face sides are equipped with joining means (72, 73).

28. (Currently Amended) Piston The piston according to claim 27 for a pump according to one of the claims 8 to 10, wherein the pot components (70, 71) are equipped in the area of their open face sides with rims (74, 75) which in the 5 assembled state form a ring groove [(76)] for accepting the a single permanent magnet ring [(20)].